CLAIMS

1. An isolated polypeptide with Fc binding ability, wherein the polypeptide is altered compared to a native Fc receptor by addition, deletion and/or substitution of one or more amino acids compared to said native receptor and said alteration results in improved characteristics compared to said native receptor with the proviso that where said polypeptide is able to bind IgG and a single alteration is present, the alteration is at a position other than residues 154 to 161 of domain 2.

2. The polypeptide of claim 1 which is an Fc receptor-like molecule with an altered ability to bind Fc wherein said altered ability is brought about by alteration of one or more amino acids which affect immunoglobulin binding ability.

3. The polypeptide of claim 1 or claim 2 which is able to bind IgG, IgE, IgA, IgM or IgD.

4. The polypeptide of claim 3 wherein the alterations are in the first and/or second domain.

5. The polypeptide of claim 4 wherein the alterations are in A/B, C/C' and/or E/F loops of domain 1 and/or G/A strand and where the polypeptide is able to bind IgG or IgE.

6. The polypeptide of claim 4 wherein the alterations are in B/C, C'/E, and/or F/G loops of domain 2 and where the polypeptide is able to bind IgE.

7. The polypeptide of claim 4 wherein the alterations ar in the B/C and/or C'/E loops of domain 2 and where the polypeptide is able to bind IgG.

8. The polypeptide of claim 5 or claim 6 having enhanced ability to bind Fc compared to a native Fc receptor in a given class.

9. The polypeptide of claim 8 wherein the alterations are in the second domain at amino acid positions 133 or 134 and optionally at 158, 159 and/or 160 compared to a native Fc receptor and said polypeptide is able to bind IgE.

10. The polypeptide of claim 9 wherein the amino acids are changed to alanine.

11. The polypeptide of claim 10 wherein Asp^{133} and/or Pro^{134} are changed to alanine.

12. The polypeptide of claim 8 wherein the alteration is in the second domain at amino acid position 130, compared to a native Fc receptor and said polypeptide is able to bind IgG.

13. The polypeptide of claim 12 wherein the amino acid altered is changed to alanine.

14. The polypeptide of claim 12 wherein Trp^{130}, is changed to alanine.

15. The polypeptide of claim 4 having a reduced ability to bind immunoglobulin compared to a native Fc receptor in a given class.

16. The polypeptide of claim 1 wherein the polypeptide is altered compared to a native Fc receptor such that the size of the polypeptide is larger than said native Fc receptor.

17. The polypeptide of any one of claims 1 to 16 which is soluble.

18. The polypeptide of claim 16 or claim 17 wherein said size is 67 to 1000 kD.

19. The polypeptide of claim 16 in the form of a fusion protein comprising an Fc binding component and a fusion component.

20. The polypeptide of claim 19 wherein the Fc binding component is an extracellular region of a native Fc receptor, a portion of said native Fc receptor or the polypeptide of any one of claims 1 to 8.

21. The polypeptide of claim 20 wherein the fusion component is a physiologically tolerated protein or other molecule selected from the group of human serum albumin, Fc receptor, complement regulating molecules, complement receptors, cytokine receptors, dextran, carbolydrate, polyetheylene glycol and synthetic polymers.

22. The polypeptide of claim 21 comprising

HSA:FcγRII.

23. The polypeptide of claim 1 comprising a component capable of detection.

24. The polypeptide of claim 23 wherein the component capable of detection comprises a direct or indirect label.

25. The polypeptide of claim 24 wherein said component capable of detection is a radiolabel, chemiluminescent label, chromophoric label, a labelled antibody, or a detectable enzyme such as horse radish peroxidase or alkaline phosphatase.

26. A method of testing a compound for its ability to act as an antagonist of an Fc receptor said method comprising contacting the compound with an isolated polypeptide with Fc binding ability or a Fc receptor or part thereof under conditions and for a time sufficient to allow any binding of the compound and the polypeptide or Fc receptor or part thereof to take place, and then determining whether binding has occurred.

27. The method of claim 26 wherein the polypeptide of any one of claims 1 to 8, 15, 16 and 33 is used.

28. The method of claim 26 wherein said compound is tested for its ability to inhibit binding of IgG or IgE.

29. An antagonist compound isolated by the method of claim 27.

30. The antagonist of claim 29 wherein said compound is capable of blocking the function of the A/B, C/C', and/or E/F loops in the first domain and/or the B/C, C'/E and/or F/G loops in the second domain and/or the G/A strand of an IgG or an IgE Fc receptor.

31. The antagonist of claim 29 which acts by binding Ig rather than Fc receptor.

32. A pharmaceutical composition comprising the polypeptide of any one of claims 1 to 22 or the antagonist of claim 29 together with a pharmaceutically appropriate carrier or diluent.

33. An isolated nucleic acid molecule encoding a polypeptide with Fc binding ability wherein the polypeptide

is altered compared to a native Fc receptor by addition, deletion and/or substitution of the amino acids encoded by the nucleic acid compared to a native Fc receptor and wherein said alteration results in improved characteristics compared to said native receptor with the proviso that where said polypeptide is able to bind IgG and a single alteration is present, the alteration is at a position other than residues 154 to 161 of domain 2.

34. The molecule of claim 33 which encodes an Fc receptor-like molecule comprising an altered ability to bind immunoglobulin wherein said ability is brought about by alteration of one or more amino acid residues which affect immunoglobulin binding ability.

35. The molecule of claim 33 or claim 34 wherein said polypeptide encoded binds IgG, IgE, IgA, IgM or IgD.

36. The molecule of claim 33 which encodes a soluble polypeptide.

37. The molecule of claim 34 wherein the polypeptide encoded has alterations in A/B, C/C' and/or E/F loops of domain 1 and/or G/A strand and where the polypeptide is able to bind IgG or IgE.

38. The molecule of claim 34 wherein the polypeptide encoded has alterations in the B/C, C'/E and/or F/G loops of domain 2 and where the polypeptide is able to bind IgE.

39. The molecule of claim 34 wherein the alterations are in the B/C and/or C'/E loops of domain 2 and where the polypeptide is able to bind IgG.

40. The molecule of claim 34 which encodes a polypeptide with an enhanced ability to bind immunoglobulin compared to a native Fc receptor in a given class.

41. The molecule of claim 37 wherein the alterations are in the second domain at amino acid positions 133 or 134 and optionally at 158, 159 and/or 160 compared to a native Fc receptor wherein said polypeptide is able to bind IgE.

42. The molecule of claim 41 wherein the amino acid altered are changed to alanine.

43. The molecule of claim 42 wherein Asp^{133} and/or

Pro^{134} are changed to alanine.

44. The molecule of claim 38 wherein the alteration is in the second domain at amino acid position 130.

45. The molecule of claim 44 where in the amino acids altered is changed to alanine.

46. The molecule of claim 45 wherein Trp^{130}, is changed to alanine.

47. A molecule of claim 34 encoding a polypeptide with a reduced ability to bind immunoglobulin compared to a native Fc receptor.

48. The molecule of claim 33 wherein the polypeptide is altered compared to a native Fc receptor such that the size of the polypeptide is larger than said native Fc receptor.

49. The molecule of any one of claims 33 to 35 and 37 to 48 wherein the polypeptide is soluble.

50. The molecule of claim 48 or claim 49 wherein the size of the polypeptide is 67 to 1000 kD

51. The molecule of claim 48 wherein said polypeptide is a fusion protein comprising an Fc binding component and a fusion component.

52. The molecule of claim 51 wherein said Fc binding component is provided by a nucleotide sequence which encodes a polypeptide having enhanced Fc binding ability compared to a native Fc receptor or by a nucleotide sequence encoding a native Fc receptor or a portion thereof.

53. The molecule of claim 52 wherein the fusion component encoded is a physiologically tolerated protein selected from the group of human serum albumin, Fc receptors, complement receptors, complement regulating proteins and cytokine receptors.

54. The molecule of claim 53 being the construct encoding HSA:FcγRII.

55. A vector comprising the molecule of any one of claims 33 to 54.

56. A host cell transformed or transfected with the

vector of claim 55.

57. A method of making a nucleic acid molecule encoding a polypeptide with Fc binding ability wherein the polypeptide is altered compared to a native Fc receptor by addition, deletion and/or substitution of one or more amino acids encoded by said molecule compared to a native Fc receptor and wherein said alteration results in improved characteristics compared to said native receptor, said method comprising producing a nucleic acid molecule encoding the polypeptide by addition, deletion and/or substitution of one or more codons specific for amino acids affecting immunoglobulin binding ability of the polypeptide with the proviso that where said polypeptide is able to bind IgG and a single alteration is present, the alteration is at a position other than residues 154 to 161 of domain 2.

58. A method of producing the polypeptides of any one of claims 1 to 25 comprising obtaining expression of the polypeptide in the host cell of claim 56.

59. A method of determining the presence and/or amount of immunoglobulin in a sample said method comprising contacting said sample with the polypeptide of any one of claims 1 to 25, or an isolated Fc receptor or part thereof, for a time and under conditions sufficient to allow the polypeptide or the Fc receptor or part thereof and any immunoglobulin present in said sample to bind, and detecting presence of and/or determining the amount of said bound polypeptide - immunoglobulin, bound Fc receptor-immunoglobulin or bound part Fc receptor-immunoglobulin.

60. A kit for detecting immunoglobulin, including for detecting immune complexes, in a sample, said kit comprising in compartmentalised form, a first compartment adapted to receive the polypeptide of any one of claims 1 to 25 or an isolated Fc receptor or a part thereof and at least one other compartment adapted to contain a detector means.

61. The method of claim 59 or the kit of claim 60

wherein said polypeptide is specific for IgG or IgE.

62. A method of removing immunoglobulin from a sample comprising contacting said sample with the polypeptide of any one of claims 1 to 22 or an isolated Fc receptor or part thereof for a time and under conditions sufficient for any immunoglobulin present in the sample to form a complex with said polypeptide or Fc receptor or part thereof and separating said complex from the remainder of the sample.

63. A method of removing immunoglobulin from a body fluid comprising taking body fluid from a patient, contacting the body fluid with the polypeptide of any one of claims 1 to 22 or an isolated Fc receptor or part thereof, for a time and under conditions sufficient to allow the polypeptide, Fc receptor or part thereof to bind said immunoglobulin, removing said bound immunoglobulin from the body fluid and replacing said body fluid in the patient.

64. The method of claim 62 or claim 63 wherein said immunoglobulin removed is immunoglobulin complex.

65. The method of claim 64 wherein the polypeptide used is specific for IgG or IgE.

66. A method of treatment of disease where an excess of immunoglobulin is implicated as a causative agent of the disease said method comprising administering an effective amount of the polypeptide according to any one of claims 1 to 22 to a patient.